

③.

$$A = \begin{bmatrix} 0 & -1 \\ 2 & 3 \end{bmatrix}$$

$$|A - \lambda I| = 0$$

$$\left| \begin{bmatrix} 0 & -1 \\ 2 & 3 \end{bmatrix} - \begin{bmatrix} \lambda & 0 \\ 0 & \lambda \end{bmatrix} \right| = 0$$

$$\begin{vmatrix} -\lambda & -1 \\ 2 & 3-\lambda \end{vmatrix} = 0$$

$$-\lambda(3-\lambda) + 2 = 0$$

$$-3\lambda + \lambda^2 + 2 = 0$$

$$\lambda^2 - 3\lambda + 2 = 0$$

$$\lambda^2 - 2\lambda - \lambda + 2 = 0$$

$$\lambda(\lambda-2) - 1(\lambda-2) = 0$$

$$\boxed{\lambda = 1, 2}$$

for $\lambda = 1$

$$(A - \lambda I) \vec{v} = 0$$

$$\begin{bmatrix} -1 & -1 \\ 2 & 2 \end{bmatrix} \begin{bmatrix} v_1 \\ v_2 \end{bmatrix} = \begin{bmatrix} 0 \\ 0 \end{bmatrix}$$

$$-v_1 - v_2 = 0$$

$$v_1 = -v_2$$

$$\text{for } \boxed{v_2 = 1; v_1 = -1}$$

for $\lambda = 2$

$$\begin{bmatrix} 1 & 0 \\ 8 & 8 \end{bmatrix} = A \quad (2)$$

$$\begin{bmatrix} -2 & -1 \\ 2 & 1 \end{bmatrix} \begin{bmatrix} v_1 \\ v_2 \end{bmatrix} = \begin{bmatrix} 0 \\ 0 \end{bmatrix}$$

$$0 = |\lambda I - A|$$

$$\begin{aligned} -2v_1 - v_2 &= 0 \\ -2v_1 &= v_2 \end{aligned} \quad 0 = \begin{vmatrix} 0 & \lambda \\ \lambda & 0 \end{vmatrix} - \begin{vmatrix} 1 & 0 \\ 2 & 8 \end{vmatrix}$$

if $v_2 = -1$

if $v_1 = 1$
 $v_2 = -2$

$$0 = \begin{vmatrix} 1 & \lambda \\ (\lambda - 8) & 8 \end{vmatrix}$$

$$\therefore \vec{v} = \begin{bmatrix} 1 \\ -2 \end{bmatrix}$$

$$0 = 8 + (\lambda - 8)8 -$$

$$0 = 8 + \lambda 8 + 88 -$$

$$0 = 8 + 88 - \lambda 8$$

$$0 = 8 + 8 - 8\lambda - \lambda 8$$

$$0 = (8 - \lambda)1 - (8 - \lambda)8$$

$$\boxed{8, 1 = \lambda}$$

for $\lambda = 1$

eigen vector = $\begin{bmatrix} -1 \\ 1 \end{bmatrix}$

$$1 = \lambda \quad \text{not}$$

for $\lambda = 2$

eigen vector = $\begin{bmatrix} 1 \\ -2 \end{bmatrix}$

$$0 = \vec{v}(\lambda I - A)$$

$$\begin{bmatrix} 0 \\ 0 \end{bmatrix} = \begin{bmatrix} \vec{v} \\ 1 \end{bmatrix} \begin{bmatrix} 1 & 1 \\ 1 & 1 \end{bmatrix}$$

yes, the solution is same as standard module in $\begin{bmatrix} 1 & 1 \\ 1 & 1 \end{bmatrix}$ to find eigen value & vector.

$$0 = \lambda v - v$$

$$\lambda v = v$$

$$\boxed{1 = \lambda : 1 = \lambda} \quad \text{not}$$